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I, LEANNE MYNOTT, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. PQ 1810 for a patent by LAURENCE MICHAEL BYRNE filed on 09 June 1999.

I further certify that pursuant to the provisions of Section 37 of the Patents Act 1990 Application No. 33957/99 was treated as a provisional application and reallocated No. PQ 1810.



WITNESS my hand this
Twenty-eighth day of June 2000

L. Mynt

LEANNE MYNOTT
TEAM LEADER EXAMINATION
SUPPORT AND SALES

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AUSTRALIA

PATENTS ACT 1990

COMPLETE SPECIFICATION

FOR A PETTY PATENT

ORIGINAL

Name of Applicant: LAURENCE MICHAEL BYRNE

Actual Inventor: Laurence Michael BYRNE

SECTION 37
I DIRECT THAT THIS APPLICATION IS TO BE
TAKEN TO BE, AND TO HAVE ALWAYS BEEN,
A PROVISIONAL APPLICATION.

Address of Service: BALDWIN SHELSTON WATERS
60 MARGARET STREET
SYDNEY NSW 2000

[Signature]
DELEGATE OF THE COMMISSIONER

27.7.99
DATE

Invention Title: "MATERIALS HANDLING SYSTEM "

The following statement is a full description of this invention, including the best method of performing it known to me/us:-

The present invention relates to a system for handling materials and in particular a system for economically transporting metropolitan waste to land fill sites.

Metropolitan waste includes household garbage and the like. Its collection and disposal is a major expense for municipal councils. Garbage trucks periodically collect 5 household garbage from the kerb side. When the truck is full it will normally take the garbage to a transfer station. At the transfer station the garbage may be sorted to separate out any recyclables. The remaining refuse is crushed or baled in a compactor. The compressed refuse is then loaded into containers for transport to a land fill site by a semitrailer.

10 With the rapid growth of cities, the volume of metropolitan waste is increasing. Furthermore, there is an increasing tendency to move the land fill sites further from urbanised centres. This has required a proportional increase in the number of garbage trucks and regional transfer stations. However, the cost to municipal councils is increasing disproportionately relative to the increase in the number of rate payers as 15 more heavy haulage trucks are required to transport the refuse the greater distance from the transfer station to the land fill site. This also involves greater indirect costs through the increased heavy haulage using the public road system.

In an attempt to address this some regional transfer stations have balers or compacters that can directly engage the end of a container on the back of a semitrailer.

20 Metropolitan waste from the garbage trucks is fed to the hoppers above the compacters which compress the refuse directly into the container on the truck thereby removing the intermediate step of loading the compressed refuse into the heavy haulage truck.

However in order to withstand the forces and pressures generated by the compressor, the

container on the truck must be fabricated from relatively thick steel. This significantly increases the weight of the container and therefore to keep the load within the maximum permissible limit for public road usage, the containers must be relatively small.

Accordingly, the volume of refuse transported is compromised. Large containers can be
5 used if the trucks do not have to travel over public roads however this is not practical
when the land fill site is a large distance from the transfer station.

One attempt to address this involves transferring large containers of compressed
refuse from the back of heavy haulage trucks onto rail cars which have much greater
weight limits. The container can then be transported by rail to a point at or near the land
10 fill site where it can be loaded back onto a heavy haulage truck and emptied into the land
fill.

This increases the volume of refuse in each container and takes the heavy haulage
trucks off public roads, however transferring the containers from the trucks to the rail
cars and then from the rail cars back to the trucks is time consuming and labour
15 intensive.

It is an object of the present invention to overcome or ameliorate one of the
problems of the prior art or at least provide a useful alternative.

Accordingly, in a first aspect the present invention provides a rail car including:
a chassis adapted to travel on a track;
20 a longitudinally extending container having a closable opening for loading or
unloading material through at least one longitudinal end thereof; and
means to enable interconnected displacement of the container relative to the
chassis to permit in situ loading via the closable opening.

In a second aspect the present invention provides a materials handling system including:

- a rail car having a chassis adapted to travel on a track;
- a longitudinally extending container having a closeable opening for loading or
- 5 unloading material through at least one longitudinal end thereof, and means to enable interconnected displacement of the container relative to the chassis to permit in situ loading via the closeable opening;
- a loading means at a materials collection point for loading material into the container through the opening;
- 10 a track for the rail car extending from the collection point to a remote distribution point; and
- an unloading means at the distribution point for unloading material from the load space through the opening; wherein,
- the container is displaced relative to the chassis to operatively engage the loading
- 15 means and the unloading means.

In a third aspect the present invention provides a method of transporting material between a collection point and a distribution point by rail using a rail car having a chassis adapted to travel on a track;

- a longitudinally extending container having a closeable opening for loading or
- 20 unloading material through at least one longitudinal end thereof, and means to permit interconnected displacement of the container relative to the chassis to permit in situ loading via the closeable opening, said method including:

providing loading means at the collection point;

displacing the container relative to the chassis to operatively engage the loading means and loading material through the opening;

returning the container to its original position relative to the chassis and transporting the rail car along the track to the distribution point;

5 providing an unloading means at the distribution point; and

displacing the container relative to the chassis to operatively engage the unloading means and unloading material through the opening.

In one preferred form, the means to enable interconnected displacement of the container relative to the chassis is a bearing between the container and the chassis such 10 that the container is selectively rotatable relative to the chassis.

Preferably the material is metropolitan waste and the collection point is a regional transfer station wherein the loading means includes a compactor for compressing the waste. In this form stabilising means are provided to support and stabilise the rail car against forced generated by the compactor.

15 In a further preferred form the distribution point is adjacent a land fill site and the unloading means is a hydraulically actuated telescopic ram capable of engaging the compressed waste through one opening in the container and pushing it out the opening in the other end of the container. In a further preferred form of this embodiment the telescopic ram pushes the compressed waste out of the other end of the container into the 20 trailer of a heavy haulage truck. Conveniently the trailer of the heavy haulage truck is provided with a conveyor means along its floor for unloading the waste into the land fill area.

The present invention will now be described by way of example only with reference to the accompanying drawings in which:

Figure 1 shows a schematic elevation of a regional transfer station according to the present invention;

5 Figure 2 shows a plan view of the regional transfer station shown in Figure 1;

Figure 3 is a schematic elevation of the rail car being unloaded at the distribution point; and

Figure 4 is a plan view of the unloading operation at the distribution point.

Referring to Figure 1, metropolitan waste is collected from the kerb side by
10 garbage trucks 1 and taken to a regional transfer station 2. The garbage truck 1 tips the metropolitan waste (not shown) into the hopper 3 of a compactor unit 4. The compactor crushes the waste material to minimise its volume. Preferably the hydraulic compactor 4 crushes the material such that it no longer has "memory". In this field "memory" describes the degree to which material resiliently returns to its original volume after
15 being compressed.

The outlet 5 of the compactor 4 is operatively engaged with the open end 11 of the container 6. The compressed waste material from successive garbage trucks 1 is progressively loaded into the container 6. The hydraulic ram (not shown) of the compactor 4 ensures that the container 6 is filled to capacity. Stabilising mounts 8 and 9
20 hold the container 6 firm against the forces exerted by the hydraulic ram of the compactor 4 during the loading process.

When the container 6 is full, the open end 11 of the container is shut and the stabilising mounts 8 and 9 are disengaged. The container is then rotated on the bearing

10 back into alignment with the chassis 12 of the rail car 7 and locked into position. The rail car 7 may then be transported via track 13 to the remote distribution point.

Referring to Figure 2 a plan view of the transfer station 2 is shown with four compacters 4 configured to simultaneously load four rail cars 7 on a spur of track 13.

5 The garbage trucks 1 enter the transfer station 2 and unload the metropolitan waste onto a conveyor surface 14 which feeds the hoppers 3 of each compactor 4.

Referring to Figures 3 and 4, unloading the waste from the rail cars 7 at or near the land fill site is equally as convenient. A spur of track 13 is provided at a location convenient to the land fill site. The rail cars 7 are positioned such that the end 11 of the

10 container 6 can be operatively engaged with the hydraulic unloading ram 15. The container 6 is rotated on bearing 10 such that it aligns with the telescopic arm 16 of the ram. Stabilising mounts 8 and 9 are engaged to provide the necessary resistance against the force of the ram 16. The ends 11 and 20 of the container 6 are opened so that the driving end 17 of the telescopic ram 16 can push the waste (not shown) out of the end 20 15 into the trailer of the truck 18. Conveniently the floor of the trailer 19 is provided with a conveyor means such as a hydraulically powered slat type conveyor surface. A suitable surface is marketed under the trade mark Walking Floor®. Then it is a simple matter for the trucks back the trailer up to the escarpment of the land fill site and simply convey the waste out of the trailer and over the edge of the escarpment.

20 It will be appreciated that a material handling system such as this has a number of inherent cost and time efficiencies. Through the use of a rail car having a container that rotates relative to the chassis many intermediate handling operations are removed. There is no need to load heavy haulage trucks at the regional transfer stations with containers

filled with compressed metropolitan waste which are then in turn loaded onto rail cars and then similarly transferred back to trucks at the land fill site. The rail car according to the present invention allows the present system which removes the need for heavy haulage trucks on the roads in metropolitan areas. Heavy haulage trucks are used at the 5 land fill sites, however these trucks will often not need to use public roads and therefore the normal weight limits will not apply. Consequently, fewer trucks are required to transport the waste to the escarpment of the land fill.

The present invention has been described herein by way of example only and skilled workers in this field would recognise many variations and modifications which 10 would not depart from the spirit and scope of the broad inventive concept.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A rail car including:
 - a chassis adapted to travel on a track;
 - a longitudinally extending container having a closable opening for loading or
- 5 unloading material through at least one longitudinal end thereof; and
 - means to enable interconnected displacement of the container relative to the chassis to permit in situ loading via the closable opening.
2. A rail car according to claim 1 wherein the means to enable interconnected displacement of the container relative to the chassis is a bearing between the container and chassis such that the container is selectively rotatable relative to the chassis.
- 10 3. A rail car according to claim 1 or claim 2 wherein both of the longitudinal ends have a closable opening for loading or unloading material.

DATED this 9th day June, 1999

LAURENCE MICHAEL BYRNE.

Attorney: CAROLINE M BOMMER
Fellow Institute of Patent Attorneys of Australia
of BALDWIN SHELSTON WATERS

ABSTRACT

A rail car for economically transporting metropolitan waste to land fill sites, the car including:

- 5 a chassis adapted to travel on a track;
- a longitudinally extending container having a closable opening for loading or unloading material through at least one longitudinal end thereof; and
- means to enable interconnected displacement of the container relative to the chassis to permit in situ loading via the closable opening. In a preferred form this is achieved by provision of a bearing between the container and chassis, such as a turn
- 10 table, that enables selective rotation of the container relative to the chassis.

Fig. 1

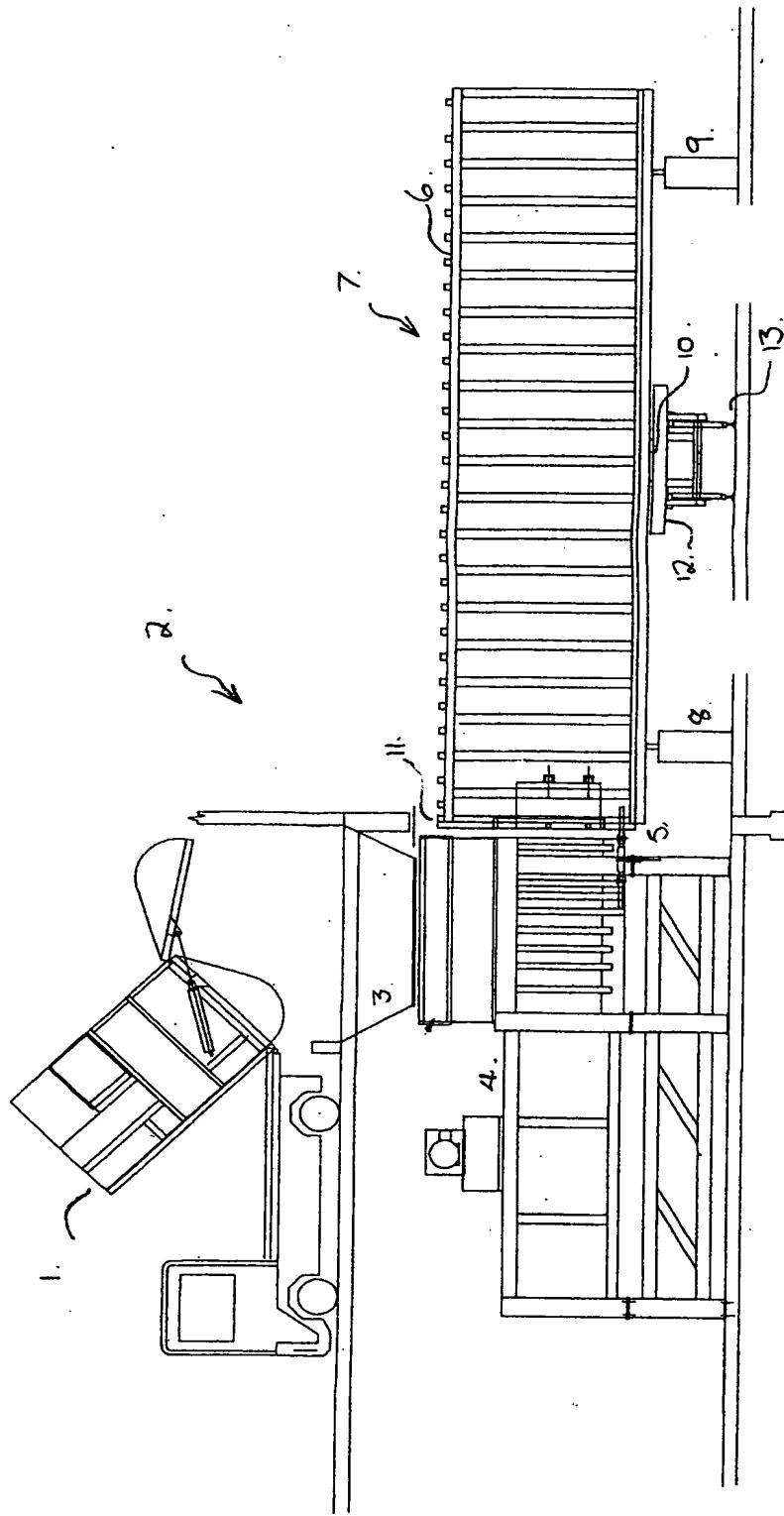


Figure 1.

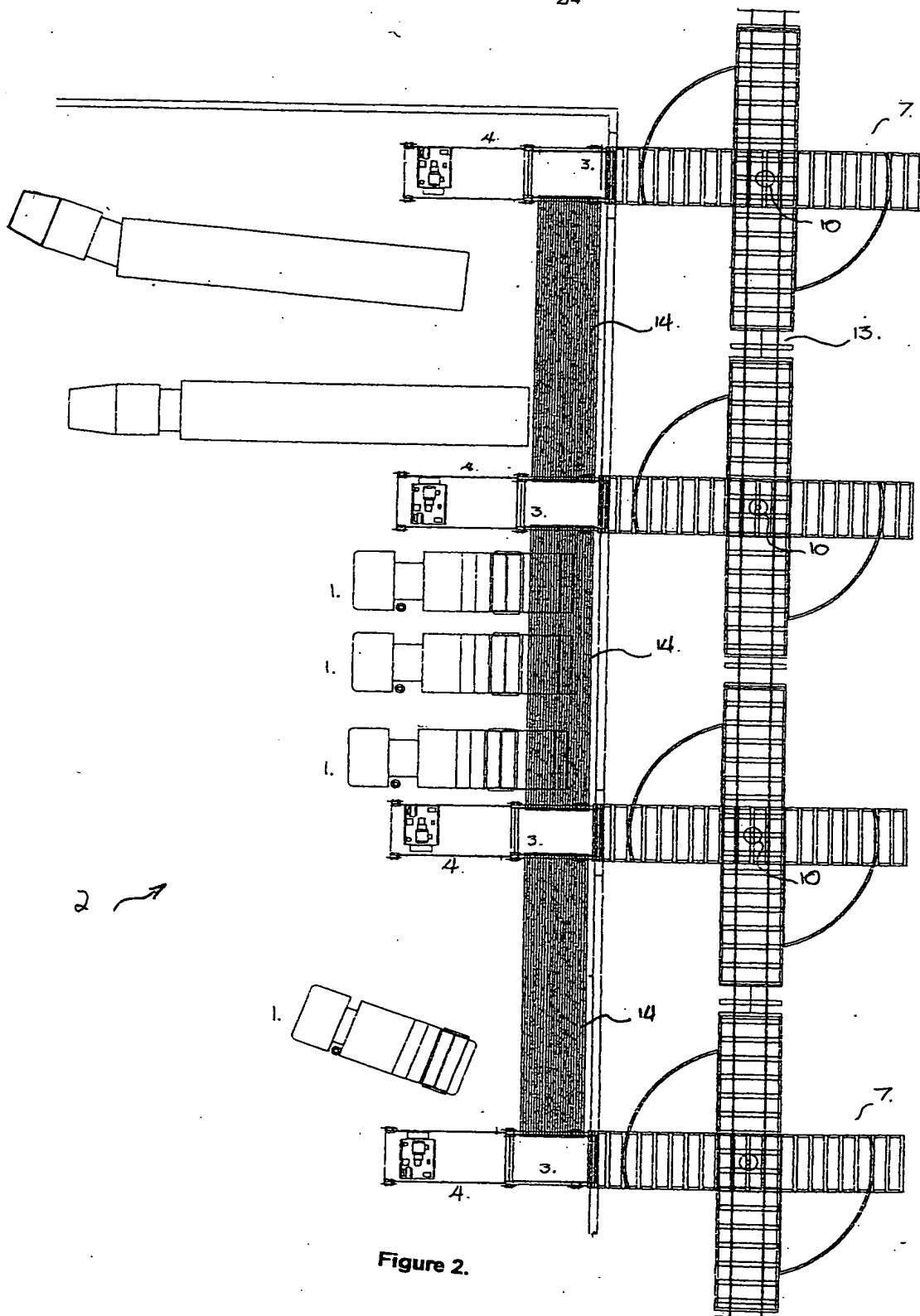


Figure 2.

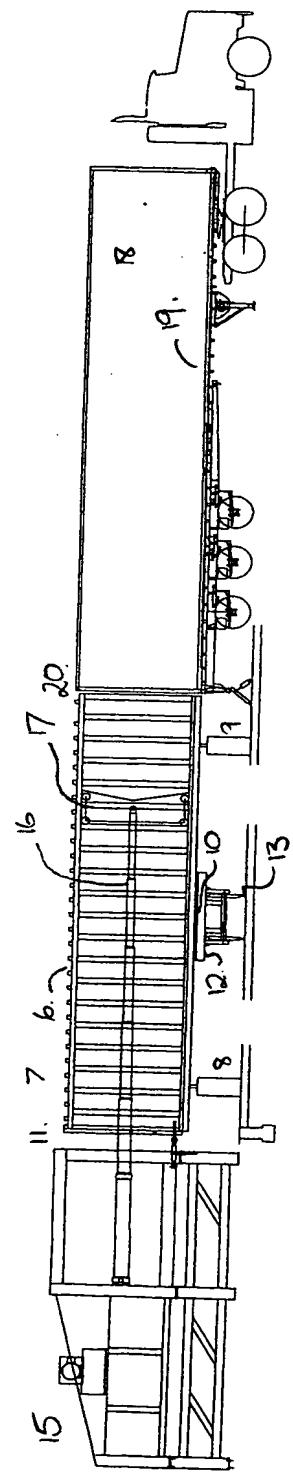


Figure 3.

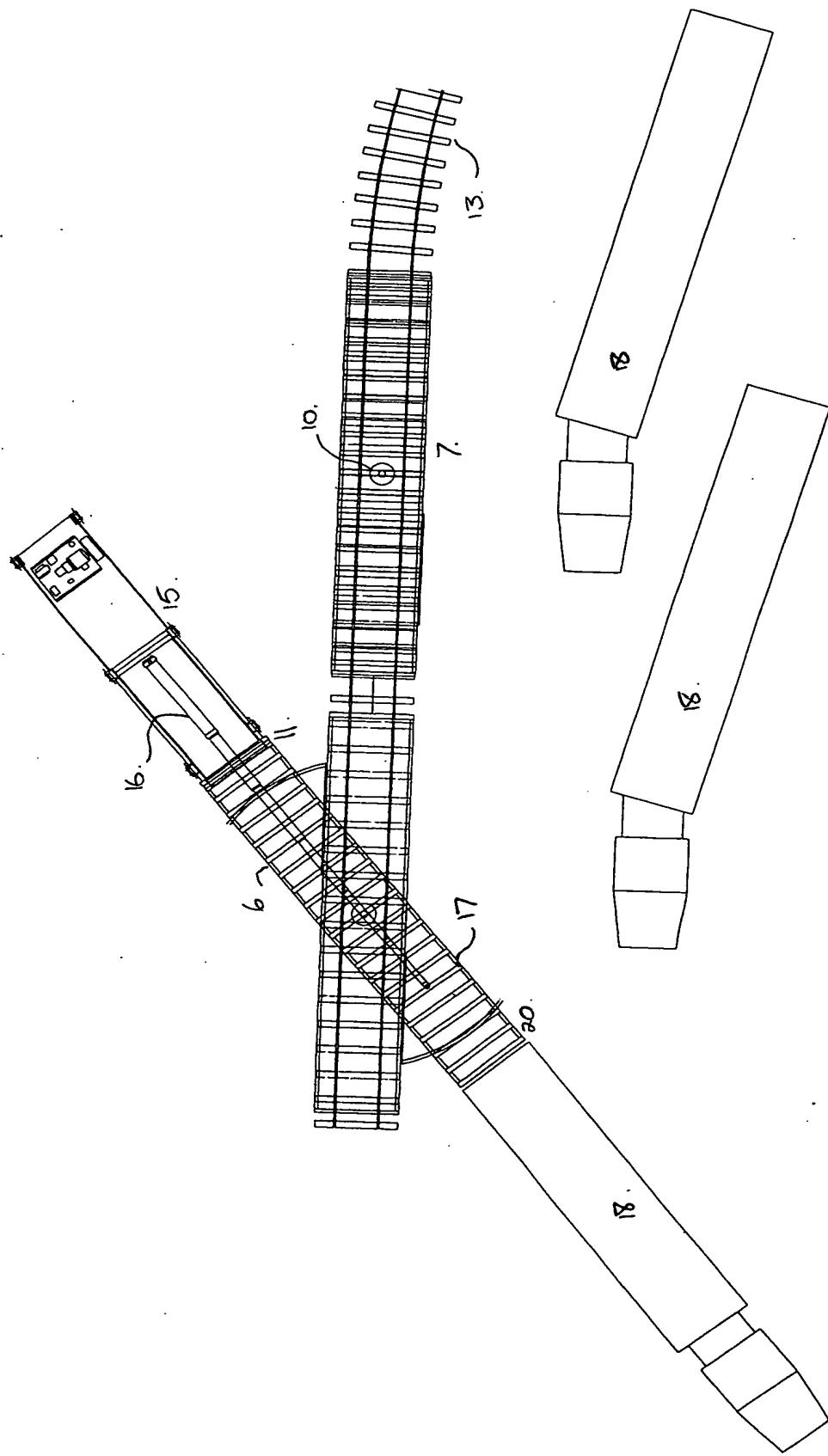


Figure 4.

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